

Near Detector Working Group Report

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LANL

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Working Group Organization

- We have only just begun
- Met at Fermilab on 8 January to discuss organizing the work
- We have since had two phone meetings

People

- Fermilab: Byron Lundberg, Jorge Morfin, Gina Rameika* (convener), Niki Saoulidou
- LANL: Christopher Mauger, Zarko Pavlovic, Sam Zeller
- South Carolina: Sanjib Mishra, Carl Rosenfeld

Our charge

- Specify the purpose, requirements, and technology options for the near detector complex for use in LB-DUSEL.
- Our goal is to produce a chapter for a CDR in a year or so.
- We will address the issues for both far detector cases
 - liquid argon (near detector more straightforward)
 - water Cherenkov (more challenges – start here)

Purpose of Near Detector Complex

Measure anything necessary such that the systematic uncertainties on the oscillation analyses are not due to uncertainties at the near detector complex

What does that mean?

- must define how near detector data will be used in the oscillation analyses
- mimicry (CR's word) vs. full measurement and prediction
- mimicry - ``identical'' detectors and selection criteria
- full measurement
 - neutrino flux (hadron measurements/MC)
 - interaction rate/cross-sections signal and background
 - Intrinsic electron neutrinos
 - NC backgrounds which mimic the electron neutrino signal
- requirements are significantly different for each case

Challenges

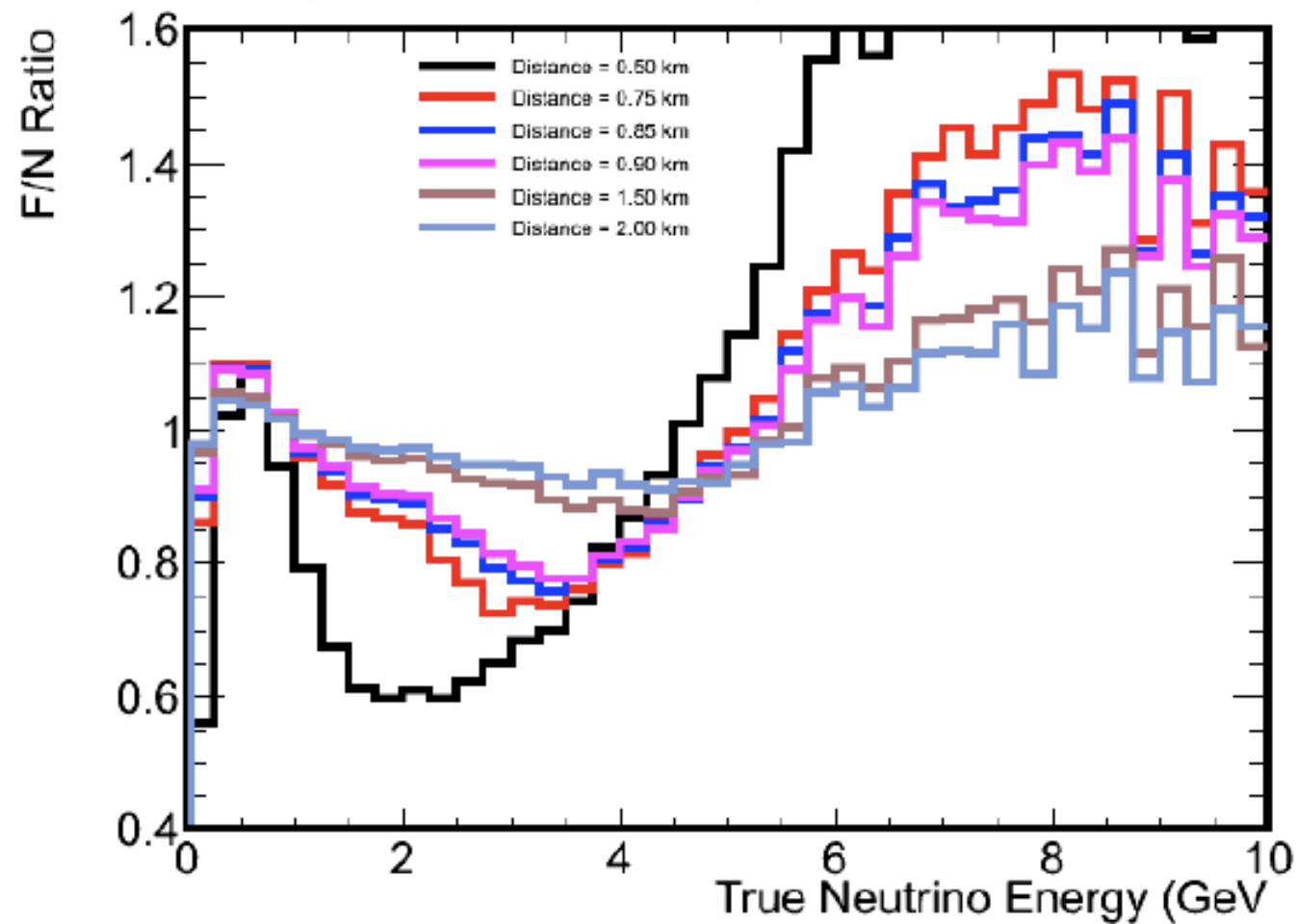
- 500-600 meters from the target to the near detector hall
 - spectra are different near to far
 - rates are extremely high



from Sam Childress

Proximity to neighborhood is being handled by Fermilab Office of Public Affairs

CC numu events, Fiducial Radius = 30 cm, Z = 500 cm



From Niki Saoulidou

Plan

- Review past, current and planned experiments (underway)
- Define how near detector data will be used
- Determine the requirements for the near detector complex
- Determine the technology options

Need strong cross-WG coordination

- Need strong beam \leftrightarrow near detector group coordination
 - implications for civil construction (hadron measurements)
 - hadron instrumentation and neutrino beam monitoring will be in the purview of the near detector group (at least for the design phase)
- Need strong ND group \leftrightarrow LB oscillation analysis coordination and far detector simulation group
 - Determine the specifications for uncertainties on the backgrounds

Conclusions

- We are just getting started
- Mimicry for water Cherenkov detectors is not promising, need to evaluate for the liquid argon case
- We have a set of tasks which much be completed in a year for the CDR (CD-1) and could use a lot of help
- We have a lot of work for the next several years to design the full set of detectors for the near detector complex, and could use a lot of help
- We could use a lot more people to help – please contact me if you would like to help